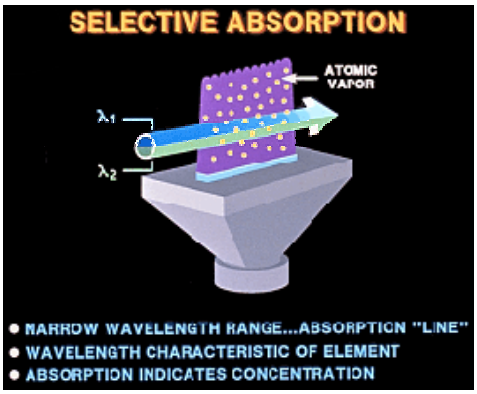
Academy savant
e-Learning Science

Atomic Absorption Spectroscopy

Video-based training programs

Principles of Atomic Absorption, Emission and Fluorescence

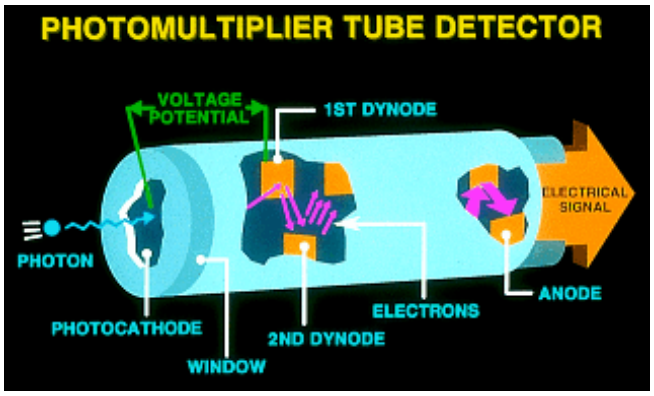
AA-101



This first program in the AA series provides an overview of analytical atomic spectroscopy with special emphasis on atomic absorption. First the history of spectrochemical methods is presented. Then the principles and origins of emission, absorption and fluorescence are clearly explained. Next, the characteristics of atomic spectra and experimental methods are described. Resolution requirements for emission are examined in detail. AA instrumentation is discussed generically. The program concludes with a summary of an AA operating procedure and a review. 45 Minutes.

Instrumentation for Atomic Absorption, Emission and Fluorescence

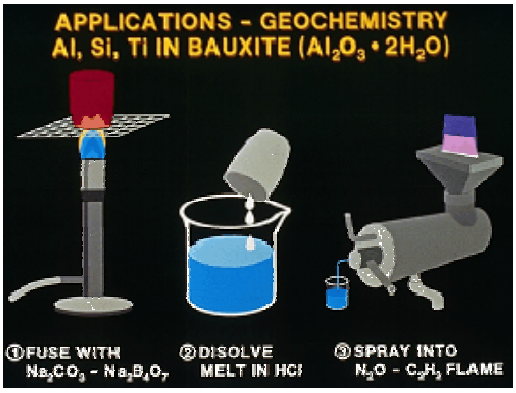
AA-102



This program gives a generic but in-depth treatment of AA instrumentation, component by component; sources, flame and non-flame atomizers, monochromators, detectors and readout/modulation systems are discussed in turn. The design and function of hollow cathode lamps are illustrated. Burner components, flame characteristics, choice of fuels, flame velocity and burner position are clearly explained. The function of the monochromator and detector are made clear as well as methods of calibration and readout. 46 Minutes.

Atomic Absorption Techniques and Applications

AA-103



This program teaches practical techniques for applying AA to the analysis of real samples, emphasizing flame atomization. First, instrumental requirements are reviewed. Next, the significance of characteristic concentration and detection limits are explained. Then the subject of errors is introduced with an explanation of the terms precision and accuracy; finally, various types of interference are discussed in detail. The laboratory techniques portion reviews calibration and sample preparation for ultra-trace, biological and inorganic samples. Typical applications taken from the clinical, water quality and geochemical areas illustrate the method's versatility. 48 Minutes

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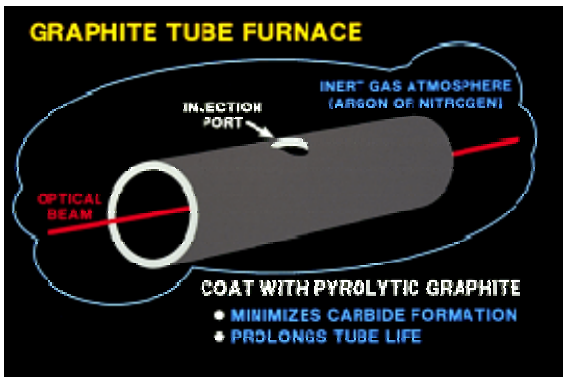
Furnace and Vapor Generation Methods in Atomic Absorption

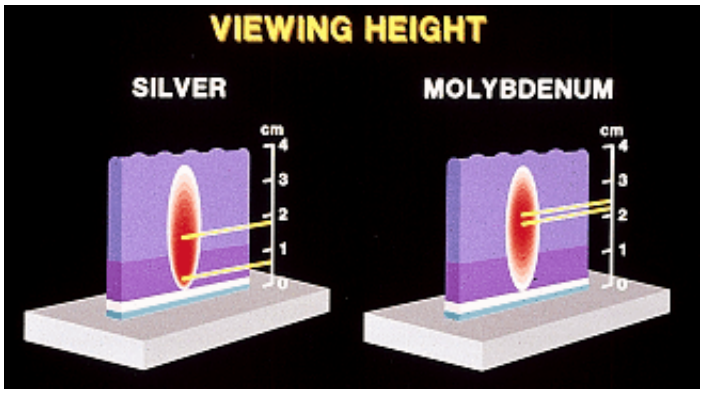
AA-104



Advantages and limitations of flame atomizers are first reviewed; the benefits of alternative atomizers are discussed. Furnace construction, the three stages of operation, and limitations, such as matrix dependence and false signals from non-specific absorption, are are explained in detail. The chemistry of the mercury vapor and volatile metal hydride techniques are explained and measurement principles presented. Advantages and limitations compared to flame techniques are given. 40 Minutes

Optimizing Instrumental Parameters in Atomic Absorption

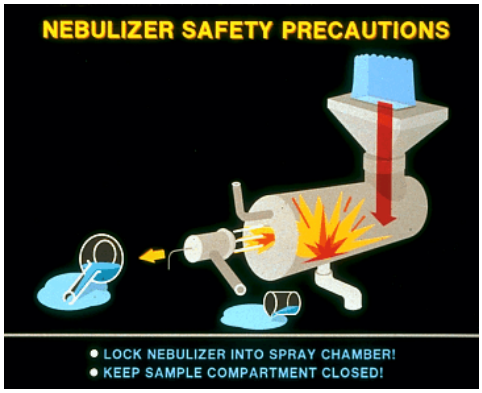
AA-105



This fifth program in the AA series teaches the more advanced worker how to derive the best performance from his instrument. First, analysis objectives and optimization criteria are defined. Then a systematic scheme is given for optimizing three major functions: 1) generation, transmission and detection of light, 2) atom production and 3) signal processing and display. Optimum setting of source parameters, wavelength, bandwidth, nebulizer rate, flame, gas flow rate, viewing height and pathlength are described. 47 Minutes.

Safety Practices for Atomic Absorption, Flame Spectroscopy

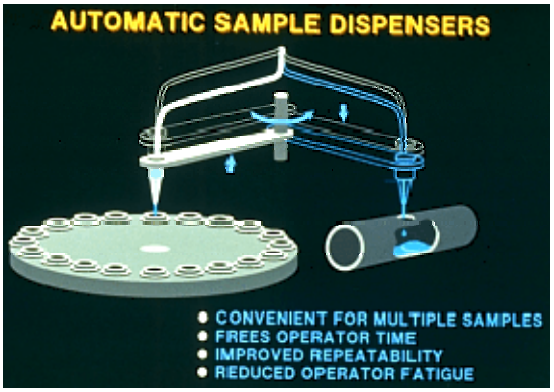
AA-106



The author shows how "accidents" in the AA lab may be foreseen and thus prevented. The program discusses potential hazards from each of several sources: electrical, heat, vapors and fumes, compressed gases, burners, seals and drains, radiation, and flammable/ toxic materials. Good operating practice is illustrated with a safety check and recommended flame lighting and shut-down procedures. The program creates safety awareness and teaches the avoidance of hazards by applying simple safety skills. 38 Minutes.

Modern Methods of Graphite Furnace Atomic Absorption

AA-107



The operation of a modern furnace is discussed in detail including the requirements for inert gas, use of a platform and autosamplers. Programming steps, including drying, charring and optional addition of matrix modifiers, all lead to a thorough discussion of the critical atomization step. Background correction techniques include continuum source, Zeeman and Smith-Hieftje. These are compared and the advantages and limitations of each are presented. The program concludes with a discussion of practical operating tips. 41 Minutes.

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